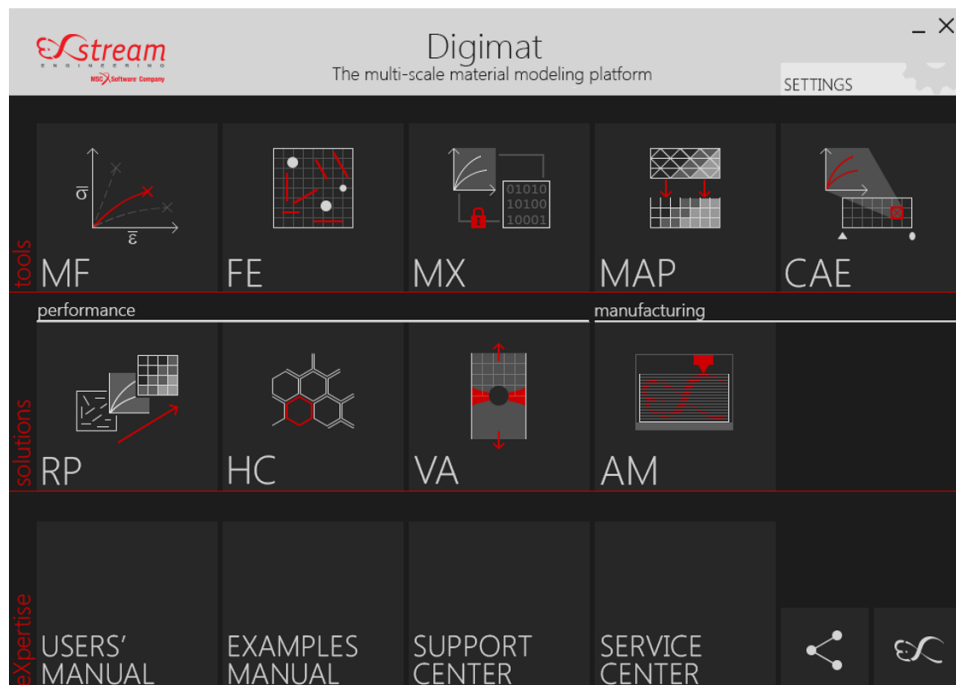




Release Notes Digimat 2019.1 – October 2019



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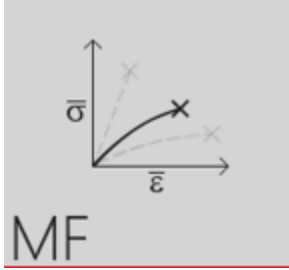
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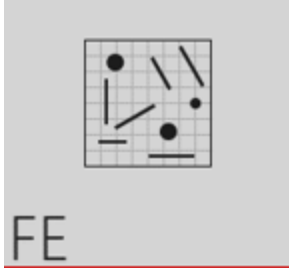
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New Capabilities

- **Revised default failure models for SFRP and CFRP**
 - Tsai-Hill 3D Transversely isotropic, strain based, for microstructures with matrix + inclusion (SFRP)
 - Multicomponent 2D for microstructures with continuous fibers (UD and woven 2D)
- **New Tsai-Wu 3D orthotropic failure model**
 - Improving failure modeling for FFF/FDM materials



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New Capabilities

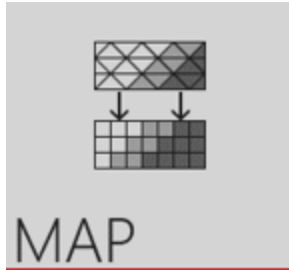
- **New additional solver within Digimat-FE/Solver, based on FFT technology**
 - Reduced run time vs Finite Element Analysis based solver
 - Reduced memory consumption vs Finite Element Analysis based solver
 - Supported for mechanical analysis of RVE involving
 - Elasticity, elastoplasticity
 - Viscoelasticity, Elastoviscoplasticity
 - Hyperelasticity, crystal plasticity
- **Improved SFRP geometry generation algorithm, enabling higher volume fraction and more accurate fiber orientation distribution**
- **More robust and efficient modeling workflow for UD stiffness and strength prediction**
 - Improved microstructure generation for better randomness and high volume fraction
 - Extruded periodic meshing for robust and efficient run
 - New waviness definition for compression case simulation
 - New initial thermal loadcase to account for manufacturing stresses
 - Phase strength distribution
 - New Turon cohesive law to model fiber/matrix interface with more physics and better convergence (available with FE/Solver only)
- **Improved RVE generation algorithm for strands enabling higher out-of-plane orientation distribution**
- **New crystal plasticity constitutive model available for polycrystal microstructures**
 - Dedicated Metal microstructure definition through Polycrystal
 - Texture import & post-processing from Digimat-FE results
 - Supported for
 - Single phase polycrystal microstructure
 - FCC, BCC, HCP crystal symmetries
 - Available with FE/Solver (FEA and FFT approach)
 - Requires dedicated add-on licenses to Digimat-FE



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New Capabilities

- **Extended reverse engineering method, now supporting**
 - Viscoelasticity models
 - Thermo-viscoelasticity models
- **New Coefficient of Thermal Expansion reverse engineering**
- **New Poisson's ratio reverse engineering**
- **Through thickness plot of fiber orientation tensor**
- **New material data in public database**
 - New models
 - Asahi-Kasei Corporation
 - DSM
 - DuPont Transportation and Industrial
 - RadiciGroup High Performance Polymers
 - SOLVAY Engineering Plastics
 - Solvay Specialty Polymers
 - SUMIKA Polymer Compounds
 - New material suppliers
 - MarkForged
 - Sintratec



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New Capabilities

- **New weld line angle filtering method**
- **New manufacturing data formats supported**
 - Hexagon VISI Flow
- **Extended data support for existing interfaces**
 - Moldflow 3D / Microcellular analysis: support of varying bubble density
 - 3D TIMON Light 3D
- **Extended mapping**
 - 1D mapping for porosity now available



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New Capabilities

- **Updated support of the existing interfaces for user subroutines for Windows & Linux (Red Hat 7 & Suse 11)**
 - Abaqus
 - 2017 / 2018 / 2019
 - ANSYS
 - 19.2 / 19R1
 - LS-DYNA
 - 9.3 / 10.1 / 10.2
 - PAM-CRASH
 - 2016 / 2017 / 2018
 - Marc
 - 2018 / 2018.1
 - Samcef
 - V16.3 / V17.2
 - nCode
 - 2018.1
- **Improved robustness of Hybrid solution for strain-rate dependent j_2 -plasticity**
- **Simplified installation of Digimat with other user subroutines for Marc**
- **Full harmonic analysis now supported with ANSYS**

Important notice

Red Hat 6 is now supported for the interface to Abaqus, LS-DYNA and PAM-CRASH.

Dedicated installers are available on the MSC Software Download Center.

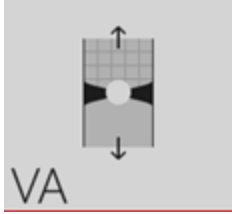
Marc coupling now only operates with input file version 2017 Style (R13) and later.



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New Capabilities

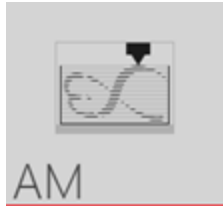
- **Improved superposition visualization for more confident mapping**
- **Simplified solution settings management**
 - Settings are split between
 - Solution settings (application oriented, not requiring Hybrid parameters re-generation)
 - Advanced solver settings (solver oriented, requiring Hybrid parameters re-generation)
 - Previous templates are deprecated
- **Updated solver for Digimat-RP/Moldex3D solver**
 - Upgrade from Moldex3D R16 to R16.1
- **Extended SFRP fatigue post-processing capabilities**
 - New plasticity correction method
 - FEA support extended to Marc on top of Abaqus and ANSYS
- **New SMC solution**
 - New material type for compression molding
 - Support of SMC type of material model
 - Elasticity
 - Viscoelasticity
 - Failure and damage
 - Support of fiber orientation and weld line manufacturing data



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New Capabilities

- **New Advanced PFA model**
 - Providing more physics and accuracy through
 - LaRC failure criteria
 - Elastoplasticity behavior for shear
 - In-situ strength
 - Intralaminar fracture toughness
 - Effect of manufacturing stresses
 - Dedicated meshing approach
 - Available for
 - UD materials
 - Unnotched and open hole tests
- **New delamination modeling**
 - Available for UD and woven materials
 - Available with Standard and Advanced PFA
- **New effect of defects workflow**
 - Enabling study of the effect of
 - Interply porosity
 - Intraply porosity
 - Out-of-plane waviness
 - Available with Standard PFA
- **Enhanced allowables computation**
 - Outliers check
 - Normalization on stiffness/strength
 - Revised allowable formula
- **Command line now available for batch mode**
- **Improved boundary condition for unnotched test**
 - New option to define free length
 - Reduced mesh sensitivity



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New capabilities

- **Improved usability for results post-processing**
 - Cut view
 - Custom reference plane definition for warpage evaluation
 - Pick node/element values
 - Manage user-defined views
 - Larger visualization window
 - Color scale exported with animation (GIF export)
- **Enhanced computational performance**
 - Thermal analysis
 - -90% result file size
 - -35% run time
 - Thermomechanical analysis
 - -85% result file size
 - -15% run time
 - Specific improvements with encrypted material models
 - -50% run time
 - -40% peak memory usage
- **New remote job submission**
 - Pre/post-processing with user interface on Windows only
 - Job run on Windows or Linux
 - Job submission: direct or via queuing system (PBS or LSF)
- **Printer database update**
 - FDM
 - New Stratasys Fortus 450mc
 - SLS
 - Sintratec Kit
 - Sintratec S1
 - Sintratec S2
- **Support of Stratasys toolpath v2.2**
 - Available from Insight 13.9 or GrabCAD Print 1.34

- **Various enhancements**
 - Improved physics in inherent strain preprocessing for FFF/FDM (energy conservation is ensured)
 - Project management
 - Save at exit when run completed / inherent strains have been computed
 - Working directory saved in the project
 - Licensing
 - User interface can be closed once job is launched, enabling the post-processing of another simulation result.

Licensing and installation

- Digimat 2019.1 configuration in scripts or command line usage requires the definition of two environment variables:
 - DIGIMAT_BIN_20191: points to installation directory
 - MSC_LICENSE_FILE: point to license file or license serverMore details on the configuration is available in the Digimat documentation.
- Digimat 2019.1 requires a new MSC Licensing server, MSC Licensing Helium, which is available from the MSC Software Download Center. Previous license files do not require an update.



The Material Modeling Company

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